IN THE CLAIMS

Please cancel claims 1-7 and replace with the following:

8. (New) A method for measuring the diameter of an optical fiber and for detecting defects in the fiber, the method comprising:

directing a beam of a laser at the fiber, radially, to produce an interference pattern;

providing a first sensor receiving said interference pattern in an angle span, with respect to an axis of said laser, through an optical system;

providing a first processing board connected to said first for analyzing said interference pattern received by said first sensor;

calibrating said first sensor so that each of several points of said first sensor corresponds to a determined value for said angle with respect to said axis of said laser axis;

using said processing board for calculating the values for A, B, D and φ so that a theoretical curve of the interference pattern, represented by :

$$M = \frac{A}{B+\theta} \times \left[1 + \sin^2\{N(D,\theta) \times \pi + \varphi\}\right]$$

$$N(D,\theta) = \frac{D}{\lambda} \times \left[\sin\frac{\theta}{2} + (n^2 + 1 - 2n \times \cos\frac{\theta}{2})^{1/2}\right] + \frac{1}{4}$$

wherein:

M is a signal amplitude, A is a calibration parameter for the signal amplitude, B is a calibration parameter for the angle, φ is a calibration parameter for the phase, N is a number of fringes, θ is a measurement angle with respect to said axis of said laser, D is a fiber diameter, and λ is a laser wavelength,

corresponds to said interference pattern received by said first sensor, in order to obtain an absolute measurement of said fiber diameter D.

9. (New) A method according to claim 1, further comprising:

providing a second sensor receiving said interference pattern in said angle span, with respect to said axis of said laser, through said optical system, said second sensor being preliminarily calibrated so that each of several points of said second sensor corresponds to a determined value for said angle with respect to said axis of said laser, said second sensor being optically aligned with said first sensor;

providing a second processing board connected to said second sensor for analyzing said interference pattern received by said second sensor, said second processing board being able to determine variations in the fiber diameter by analyzing shift in said fringes via to a relation:

$$dD = -\lambda \times \frac{dN}{\sin\frac{\theta}{2} + (n^2 + 1 - 2n \times \cos\frac{\theta}{2})^{1/2}}$$

10. (New) A method according to claim 9, wherein said calibrating of said first sensor and said second sensor includes:

providing a calibration bench external to said first sensor and said second sensor and an angle coder whose center is located on an axis of the fiber when the fiber present;

referencing said angle coder with respect to said laser axis using an optic focusing and a voltage sensor that provides proportional voltage to a position of a laser spot;

referencing a mirror located on said axis of the fiber, when present, using said angle coder, said optic focusing and said voltage sensor;

fixing said mirror and said angle coder;

deflecting said laser angularly with said mirror onto successive points of said several points of said first sensor and said second sensor through said optical system, said deflecting precisely locating the angle positions of said successive points via to said angle coder.

11. (New) a method according to claim 10, wherein said first processing board periodically provides an absolute value of said fiber diameter via a digital analysis and, at the same time, said second processing board continually provides a relative value of the variation of said fiber diameter via an analog analysis, wherein said absolute value of said fiber diameter provided by said first processing board is used to initialize said second processing board to provide a continuous, rapid, and absolute measurement of said diameter.

12. (New) A method according to claim 11, further comprising:

generating, from said several points of said second sensor, two sinusoidal signals and two logic signals allowing said digital analysis of said fringe shift per quarter period;

interpolating between each switching of at least one of said two logic signals and a continuous variation of said fringe phase by calculating an appropriate arctangent between said two sinusoidal signals;

adding of results of said analysis and said interpolation to provide said continuous, rapid, and high-resolution measurement in said broad variation span of the diameter.

13. (New) A method according to claim 5, further comprising:

detecting fringe contrast loss in order to detect, in real time, by analog analysis, presence of defects in the fiber; and

using said amplitude difference between a theoretical model and a measured signal to detect very small defects by digital processing.

14. (New) A device for measuring diameter of an optical fiber and for detecting defects in the fiber, comprising:

a laser adapted to radially direct a beam at the fiber to produce an interference pattern;

an optical system configured to receive the interference pattern in an angle span, with respect to an axis of the laser, and configured to project said pattern to a first sensor and a second sensor, optically aligned and located in a focal plane of said optical system;

a first processing board connected to said first sensor, said first board being configured for analyzing said interference pattern received by said first sensor and, consequently, configured to periodically determine absolute diameter of the fiber; and

a second processing board connected to the second sensor, said second board being configured for analyzing the interference pattern received by the second sensor and, consequently, configured to continually determine fiber diameter variations by analyzing fringes shift, wherein

said first board and said processing board are connected so that said second processing board is initialized by said first processing board, in order to provide a continuous, rapid and absolute measurement of the diameter of the fiber.

15. (New) A device according to claim 14, wherein said angle span of said sensors is between 40° and 80°.